Claims

1. An integrated circuit system comprising:

at least one integrated circuit having a substrate with at least one semiconductor component assembled on the substrate;

a cooling body configured to dissipate heat generated by the integrated circuit; and

a latent heat storage module having a latent heat storage medium which is thermally connected to the cooling body to temporarily store the heat generated by the integrated circuit and to convey it to the cooling body, the substrate being in direct thermal contact with the latent heat storage module.

2. An integrated circuit system according to claim 1, wherein the substrate is a direct copper bonding substrate which is formed by a ceramics structure coated at least partially with copper on the front and rear side thereof.

3. An integrated circuit system according to claim 1, wherein the substrate is mechanically fixed to the latent heat storage module by at least one screwed connection.

4. An integrated circuit system according to claim 1, wherein the substrate is mechanically fixed to the latent heat storage module by a material-joining connection.

5. An integrated circuit system according to claim 4, wherein the material-joining connection is formed by soldering, welding or gluing.

6. An integrated circuit system according to claim 1, wherein the latent heat storage module has a latent heat storage housing which forms a hollow body filled with the latent heat storage medium.

7. An integrated circuit system according to claim 6, wherein the latent heat storage housing includes a wall in thermal contact with the integrated circuit and at least partially formed by the substrate.

8. An integrated circuit system according to claim 7, wherein the substrate has at least one electrically conductive thermal coupling element on which the semiconductor component is assembled and an electrically insulating frame in which the thermal coupling element is embedded.

9. An integrated circuit system according to claim 8, wherein the thermal coupling element has a substantially U-shaped cross-section, the semiconductor component is assembled on the base of the thermal coupling element and the two limbs of the thermal coupling element are surrounded by the latent heat storage medium.

10. An integrated circuit system according to claim 8, wherein the thermal coupling element forms the electrical bulk bonding of the semiconductor component.

11. An integrated circuit system according to claim 10, wherein two or more semiconductor components are provided having different bulk potentials, and various thermal coupling elements electrically insulated from one another are provided for the semiconductor components with different bulk potentials.

12. An integrated circuit system according to claim 1, wherein the latent heat storage housing includes a wall in thermal contact with the cooling body and at least partially formed by the cooling body.

13. An integrated circuit system according to claim 1, further comprising at least one heat-conducting rib thermally connected to the latent heat storage housing and protruding into the interior volume of the hollow body.

14. An integrated circuit system according to claim 13, wherein the heat-conducting rib is formed by a plate which is held on the latent heat storage housing in corresponding grooves of a wall of the latent heat storage housing.

15. An integrated circuit system according to claim 13, wherein the latent heat storage housing is formed by strengthened peripheral regions of a plurality of heat-

conducting ribs arranged substantially in parallel to one another and connected to one another.

16. An integrated circuit system according to claim 15, wherein the heat-conducting ribs are connected to one another via grooves and tongues formed in the strengthened peripheral regions.

17. An integrated circuit system according to claim 1, wherein the semiconductor component is connected to the substrate by a soldered connection.

18. An integrated circuit system according to claim 1, wherein the semiconductor component is connected to the substrate by a glued connection.

19. An integrated circuit system according to claim 1, wherein the semiconductor component is connected to the substrate by a press-fit connection.

20. An integrated circuit system according to claim 1, wherein the latent heat storage medium is paraffin.

21. An integrated circuit system according to claim 1, wherein the semiconductor component is electrically connected on an upper side thereof by at least one wire-bonded connection.

22. An integrated circuit system according to claim 1, wherein the semiconductor component is electrically

connected on an upper side thereof by at least one joined connection.

23. An integrated circuit system according to claim 1, wherein the semiconductor component is electrically connected on an upper side thereof by at least one press-fit connection.

24. An integrated circuit system according to claim 1, wherein the cooling body has at least one cooling rib for conveyance of heat.

25. An integrated circuit system according to claim 1, wherein the cooling body is connectable to a cooling circuit.

26. A latent heat storage module for use in a cooling device for cooling of at least one integrated circuit, the latent heat storage module having a latent heat storage medium and being thermally connected to a cooling body for conveyance of heat generated by the at least one integrated circuit and directly thermally connected to a substrate on which the at least one integrated circuit is mounted to temporarily store the heat generated by the integrated circuit and to convey it to the cooling body.

27. A latent heat storage module according to claim 26, wherein the latent heat storage module is configured to have

the substrate mechanically fixed thereto by at least one screwed connection.

28. A latent heat storage module according to claim 26, wherein the latent heat storage module is configured to have the substrate is mechanically fixed thereto by a material-joining connection.

29. A latent heat storage module according to claim 28 wherein the material joining connection is soldering, welding or gluing.

30. A latent heat storage module according to claim 26, wherein the latent heat storage module has a latent heat storage housing which forms a hollow body filled with the latent heat storage medium.

31. A latent heat storage module according to claim 30, wherein the latent heat storage housing includes a wall in thermal contact with the integrated circuit and at least partially formed by the substrate.

32. A latent heat storage module according to claim 30, wherein the latent heat storage housing includes a wall in thermal contact with the cooling body and at least partially formed by the cooling body.

33. A latent heat storage module according to claim 30, further comprising at least one heat-conducting rib

thermally connected to the latent heat storage housing and protruding into the interior volume of the hollow body.

34. A latent heat storage module according to claim 33, wherein the heat-conducting rib is formed by a plate which is held on the latent heat storage housing in corresponding grooves.

35. A latent heat storage module according to claim 33, wherein the latent heat storage housing is formed by strengthened peripheral regions of a plurality of heat-conducting ribs arranged substantially in parallel to one another and connected to one another.

36. A latent heat storage module according to claim 35, wherein the heat-conducting ribs are connected to one another by grooves and tongues.

37. A latent heat storage module according to claim 36, wherein the grooves and tongues are formed in the peripheral regions and extend around the periphery of the heat conducting ribs.

38. A latent heat storage module according to claim 26, wherein the latent heat storage medium is paraffin.